

SEQUENCE LISTING

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<120> ACTIVATING MUTATIONS OF PLATELET DERIVED GROWTH FACTOR RECEPTOR
ALPHA (PDGFRA) AS DIAGNOSTIC MARKERS AND THERAPEUTIC TARGETS

<130> 899-65892

<150> US 60/389,107

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<150> US 60/438,899

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<170> PatentIn version 3.2

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970

975

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Ile Thr Glu Tyr Cys Phe Tyr Gly Asp Leu Val Asn Tyr Leu His Lys
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Arg Ser Lys Leu Lys Leu Ile Arg Ala Lys Glu Glu Asp Ser Gly His	
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Phe Leu Ala Ser Lys Asn Cys Val His Arg Asp Leu Ala Ala Arg Asn				
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Lys Tyr Ser Asp Ile Gln Arg Ser Leu Tyr Asp Arg Pro Ala Ser Tyr
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Gln Val Ala Arg Gly Met Glu Phe Leu Ala Ser Lys Asn Cys Val His
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Arg Asp Leu Ala Ala Arg Asn Val Leu Leu Ala Gln Gly Lys Ile Val
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Lys Ile Cys Asp Phe Gly Leu Ala Arg Asp Ser Asn Tyr Val Ser Lys
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Gly Ser Thr Phe Leu Pro Val Lys Trp Met Ala Pro Glu Ser Ile Phe
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Asp Asn Leu Tyr Thr Thr Leu Ser Asp Val Trp Ser Tyr Gly Ile Leu

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870

875

880

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280

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 Phe Leu Val Leu Gly Cys Leu Leu Thr Gly Leu Ser Leu Ile Leu Cys
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 Gln Leu Ser Leu Pro Ser Ile Leu Pro Asn Glu Asn Glu Lys Val Val
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Arg Asn Glu Glu Asn Asn Ser Gly Leu Phe Val Thr Val Leu Glu Val				
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Ser Ser Ala Ser Ala Ala His Thr Gly Leu Tyr Thr Cys Tyr Tyr Asn				
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cac act cag aca gaa gag aat gag ctt gaa ggc agg cac att tac atc				751
His Thr Gln Thr Glu Glu Asn Glu Leu Glu Gly Arg His Ile Tyr Ile				
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Tyr Val Pro Asp Pro Asp Val Ala Phe Val Pro Leu Gly Met Thr Asp				
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Tyr Leu Val Ile Val Glu Asp Asp Asp Ser Ala Ile Ile Pro Cys Arg				
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Thr Thr Asp Pro Glu Thr Pro Val Thr Leu His Asn Ser Glu Gly Val				
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Val Pro Ala Ser Tyr Asp Ser Arg Gln Gly Phe Asn Gly Thr Phe Thr				
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Val Gly Pro Tyr Ile Cys Glu Ala Thr Val Lys Gly Lys Lys Phe Gln				
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Thr Ile Pro Phe Asn Val Tyr Ala Leu Lys Ala Thr Ser Glu Leu Asp				
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Thr Tyr Pro Gly Glu Val Lys Gly Lys Gly Ile Thr Met Leu Glu Glu				
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Ile Lys Val Pro Ser Ile Lys Leu Val Tyr Thr Leu Thr Val Pro Glu				
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gcc acg gtg aaa gac agt gga gat tac gaa tgt gct gcc cgc cag gct				1279
Ala Thr Val Lys Asp Ser Gly Asp Tyr Glu Cys Ala Ala Arg Gln Ala				
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cct ccc agg ata tcc tgg ctg aaa aac aat ctg act ctg att gaa aat Pro Pro Arg Ile Ser Trp Leu Lys Asn Asn Leu Thr Leu Ile Glu Asn 345 350 355	1471
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gaa ctg tta act caa gtt cct tca tcc att ctg gac ttg gtc gat gat Glu Leu Leu Thr Gln Val Pro Ser Ser Ile Leu Asp Leu Val Asp Asp 410 415 420	1663
cac cat ggc tca act ggg gga cag acg gtg agg tgc aca gct gaa ggc His His Gly Ser Thr Gly Gly Gln Thr Val Arg Cys Thr Ala Glu Gly 425 430 435	1711
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Lys Pro Arg Tyr Glu Ile Arg Trp Arg Val Ile Glu Ser Ile Pro Tyr	
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Tyr Leu His Lys Asn Arg Asp Ser Phe Leu Ser His His Pro Glu Lys	
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Asp Met Lys Gln Ala Asp Thr Thr Gln Tyr Val Pro Met Leu Glu Arg	
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Lys Glu Val Ser Lys Tyr Ser Asp Ile Gln Arg Ser Leu Tyr Asp Arg	
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Leu Leu Ser Asp Asp Asn Ser Glu Gly Leu Thr Leu Leu Asp Leu Leu	780	785	790	
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Ser Phe Thr Tyr Gln Val Ala Arg Gly Met Glu Phe Leu Ala Ser Lys	795	800	805	
aat tgt gtc cac cgt gat ctg gct gct cgc aac gtc ctc ctg gca caa				2863
Asn Cys Val His Arg Asp Leu Ala Arg Asn Val Leu Leu Ala Gln	810	815	820	
gga aaa att gtg aag atc tgt gac ttt ggc ctg gcc aga gac atc atg				2911
Gly Lys Ile Val Lys Ile Cys Asp Phe Gly Leu Ala Arg Asp Ile Met	825	830	835	
cat gat tcg aac tat gtg tcg aaa ggc agt acc ttt ctg ccc gtg aag				2959
His Asp Ser Asn Tyr Val Ser Lys Gly Ser Thr Phe Leu Pro Val Lys	840	845	850	855
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Trp Met Ala Pro Glu Ser Ile Phe Asp Asn Leu Tyr Thr Thr Leu Ser	860	865	870	
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Asp Val Trp Ser Tyr Gly Ile Leu Leu Trp Glu Ile Phe Ser Leu Gly	875	880	885	
ggc acc cct tac ccc ggc atg atg gtg gat tct act ttc tac aat aag				3103
Gly Thr Pro Tyr Pro Gly Met Met Val Asp Ser Thr Phe Tyr Asn Lys	890	895	900	
atc aag agt ggg tac cgg atg gcc aag cct gac cac gct acc agt gaa				3151
Ile Lys Ser Gly Tyr Arg Met Ala Lys Pro Asp His Ala Thr Ser Glu	905	910	915	
gtc tac gag atc atg gtg aaa tgc tgg aac agt gag ccg gag aag aga				3199
Val Tyr Glu Ile Met Val Lys Cys Trp Asn Ser Glu Pro Glu Lys Arg	920	925	930	935
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Pro Ser Phe Tyr His Leu Ser Glu Ile Val Glu Asn Leu Leu Pro Gly	940	945	950	
caa tat aaa aag agt tat gaa aaa att cac ctg gac ttc ctg aag agt				3295
Gln Tyr Lys Lys Ser Tyr Glu Lys Ile His Leu Asp Phe Leu Lys Ser	955	960	965	
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Asp His Pro Ala Val Ala Arg Met Arg Val Asp Ser Asp Asn Ala Tyr	970	975	980	
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Ile Gly Val Thr Tyr Lys Asn Glu Glu Asp Lys Leu Lys Asp Trp Glu	985	990	995	
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Gly Gly Leu Asp Glu Gln Arg Leu Ser Ala Asp Ser Gly Tyr Ile	1000	1005	1010	
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Ile Glu Thr Gly Ser Ser Ser Ser Thr Phe Ile Lys Arg Glu Asp			
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Ser Ala Ile Ile Pro Cys Arg Thr Thr Asp Pro Glu Thr Pro Val Thr
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Leu His Asn Ser Glu Gly Val Val Pro Ala Ser Tyr Asp Ser Arg Gln
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Val Ile Glu Ser Ile Pro Tyr Ile Tyr Val Asp Pro Met Gln Leu Pro
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His Thr Gln Thr Glu Glu Asn Glu Leu Glu Gly Arg His Ile Tyr Ile			
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Cys Phe Gly Glu Ser Glu Val Ser Trp Gln Tyr Pro Met Ser Glu Glu
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Glu Ser Ser Asp Val Glu Ile Arg Asn Glu Glu Asn Asn Ser Gly Leu
65           70           75           80

Phe Val Thr Val Leu Glu Val Ser Ser Ala Ser Ala Ala His Thr Gly
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Leu Tyr Thr Cys Tyr Tyr Asn His Thr Gln Thr Glu Glu Asn Glu Leu
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Glu Gly Arg His Ile Tyr Ile Tyr Val Pro Asp Pro Asp Val Ala Phe
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Val Pro Leu Gly Met Thr Asp Tyr Leu Val Ile Val Glu Asp Asp Asp
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Ser Ala Ile Ile Pro Cys Arg Thr Thr Asp Pro Glu Thr Pro Val Thr

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Val Lys Gly Lys Lys Phe Gln Thr Ile Pro Phe Asn Val Tyr Ala Leu	195	200	205
Lys Ala Thr Ser Glu Leu Asp Leu Glu Met Glu Ala Leu Lys Thr Val	210	215	220
Tyr Lys Ser Gly Glu Thr Ile Val Val Thr Cys Ala Val Phe Asn Asn	225	230	235
Glu Val Val Asp Leu Gln Trp Thr Tyr Pro Gly Glu Val Lys Gly Lys	245	250	255
Gly Ile Thr Met Leu Glu Glu Ile Lys Val Pro Ser Ile Lys Leu Val	260	265	270
Tyr Thr Leu Thr Val Pro Glu Ala Thr Val Lys Asp Ser Gly Asp Tyr	275	280	285
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Val Thr Ile Ser Val His Glu Lys Gly Phe Ile Glu Ile Lys Pro Thr	305	310	315
Phe Ser Gln Leu Glu Ala Val Asn Leu His Glu Val Lys His Phe Val	325	330	335
Val Glu Val Arg Ala Tyr Pro Pro Pro Arg Ile Ser Trp Leu Lys Asn	340	345	350
Asn Leu Thr Leu Ile Glu Asn Leu Thr Glu Ile Thr Thr Asp Val Glu	355	360	365
Lys Ile Gln Glu Ile Arg Tyr Arg Ser Lys Leu Lys Leu Ile Arg Ala	370	375	380
Lys Glu Glu Asp Ser Gly His Tyr Thr Ile Val Ala Gln Asn Glu Asp	385	390	395
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Ile Cys Lys Asp Ile Lys Lys Cys Asn Asn Glu Thr Ser Trp Thr Ile
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Gly Leu Ser Arg Ser Gln Pro Val Met Lys Val Ala Val Lys Met Leu
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Leu Ser His His Pro Glu Lys Pro Lys Lys Glu Leu Asp Ile Phe Gly
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Glu Asn Asn Gly Asp Tyr Met Asp Met Lys Gln Ala Asp Thr Thr Gln
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Tyr Val Pro Met Leu Glu Arg Lys Glu Val Ser Lys Tyr Ser Asp Ile
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Gly Leu Ala Arg Asp Ile Met His Asp Ser Asn Tyr Val Ser Lys Gly
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Ser Thr Phe Leu Pro Val Lys Trp Met Ala Pro Glu Ser Ile Phe Asp
 850 855 860

Asn Leu Tyr Thr Thr Leu Ser Asp Val Trp Ser Tyr Gly Ile Leu Leu
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Asp Ser Thr Phe Tyr Asn Lys Ile Lys Ser Gly Tyr Arg Met Ala Lys
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Ser Glu Glu Ser Ala Ile Glu Thr Gly Ser Ser Ser Ser Thr Phe			
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Ile Lys Arg Glu Asp Glu Thr Ile Glu Asp Ile Asp Met Met Asp			
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Cys Phe Gly Glu Ser Glu Val Ser Trp Gln Tyr Pro Met Ser Glu Glu
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Phe Val Thr Val Leu Glu Val Ser Ser Ala Ser Ala Ala His Thr Gly
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Leu Tyr Thr Cys Tyr Tyr Asn His Thr Gln Thr Glu Glu Asn Glu Leu

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105

110

Glu Gly Arg His Ile Tyr Ile Tyr Val Pro Asp Pro Asp Val Ala Phe
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Val Pro Leu Gly Met Thr Asp Tyr Leu Val Ile Val Glu Asp Asp Asp
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Ser Ala Ile Ile Pro Cys Arg Thr Thr Asp Pro Glu Thr Pro Val Thr
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Leu His Asn Ser Glu Gly Val Val Pro Ala Ser Tyr Asp Ser Arg Gln
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Gly Phe Asn Gly Thr Phe Thr Val Gly Pro Tyr Ile Cys Glu Ala Thr
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Val Lys Gly Lys Lys Phe Gln Thr Ile Pro Phe Asn Val Tyr Ala Leu
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Tyr Thr Leu Thr Val Pro Glu Ala Thr Val Lys Asp Ser Gly Asp Tyr
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Glu Cys Ala Ala Arg Gln Ala Thr Arg Glu Val Lys Glu Met Lys Lys
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Val Thr Ile Ser Val His Glu Lys Gly Phe Ile Glu Ile Lys Pro Thr
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Val Glu Val Arg Ala Tyr Pro Pro Pro Arg Ile Ser Trp Leu Lys Asn
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Ala Val Lys Ser Tyr Thr Phe Glu Leu Leu Thr Gln Val Pro Ser Ser
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Val Ile Glu Ser Ile Ser Pro Asp Gly His Glu Tyr Ile Tyr Val Asp
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Pro Met Gln Leu Pro Tyr Asp Ser Arg Trp Glu Phe Pro Arg Asp Gly
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Val Ile Leu Ser Phe Glu Asn Asn Gly Asp Tyr Met Asp Met Lys Gln
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Ala Asp Thr Thr Gln Tyr Val Pro Met Leu Glu Arg Lys Glu Val Ser
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Lys Tyr Ser Asp Ile Gln Arg Ser Leu Tyr Asp Arg Pro Ala Ser Tyr
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Lys Ile Cys Asp Phe Gly Leu Ala Lys Ile Ile Met His Asp Ser Asn
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Tyr Val Ser Lys Gly Ser Thr Phe Leu Pro Val Lys Trp Met Ala Pro
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Tyr Gly Ile Leu Leu Trp Glu Ile Phe Ser Leu Gly Gly Thr Pro Tyr
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Pro Gly Met Met Val Asp Ser Thr Phe Tyr Asn Lys Ile Lys Ser Gly
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Tyr Arg Met Ala Lys Pro Asp His Ala Thr Ser Glu Val Tyr Glu Ile
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Met Val Lys Cys Trp Asn Ser Glu Pro Glu Lys Arg Pro Ser Phe Tyr
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His Leu Ser Glu Ile Val Glu Asn Leu Leu Pro Gly Gln Tyr Lys Lys
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Ser Tyr Glu Lys Ile His Leu Asp Phe Leu Lys Ser Asp His Pro Ala
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Val Ala Arg Met Arg Val Asp Ser Asp Asn Ala Tyr Ile Gly Val Thr
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Tyr Lys Asn Glu Glu Asp Lys Leu Lys Asp Trp Glu Gly Gly Leu Asp
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Glu Gln Arg Leu Ser Ala Asp Ser Gly Tyr Ile Ile Pro Leu Pro
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Phe Leu Val Leu Gly Cys Leu Leu Thr Gly Leu Ser Leu Ile Leu Cys
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agc agt gcc tcg gcg gcc cac aca ggg ttg tac act tgc tat tac aac Ser Ser Ala Ser Ala Ala His Thr Gly Leu Tyr Thr Cys Tyr Tyr Asn 90 95 100	703
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 315 320 325

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 Asn Leu His Glu Val Lys His Phe Val Val Glu Val Arg Ala Tyr Pro
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 Tyr Thr Ile Val Ala Gln Asn Glu Asp Ala Val Lys Ser Tyr Thr Phe
 395 400 405

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 Glu Leu Leu Thr Gln Val Pro Ser Ser Ile Leu Asp Leu Val Asp Asp
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 His His Gly Ser Thr Gly Gly Gln Thr Val Arg Cys Thr Ala Glu Gly
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 Thr Pro Leu Pro Asp Ile Glu Trp Met Ile Cys Lys Asp Ile Lys Lys
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Val	Ile	Val	Ile	Ile	Ser	Leu	Ile	Val	Leu	Val	Val	Ile	Trp	Lys	Gln		
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Lys	Pro	Arg	Tyr	Glu	Ile	Arg	Trp	Xaa	Xaa	Xaa	Xaa	Xaa	Ile	Xaa	Xaa		
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nnn	nnn	nnn	nnn	tat	att	tat	gtg	gac	ccg	atg	cag	ctg	cct	tat	gac		2143
Xaa	Xaa	Xaa	Xaa	Tyr	Ile	Tyr	Val	Asp	Pro	Met	Gln	Leu	Pro	Tyr	Asp		
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Ser	Arg	Trp	Glu	Phe	Pro	Arg	Asp	Gly	Leu	Val	Leu	Gly	Arg	Val	Leu		
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Ser	Arg	Ser	Gln	Pro	Val	Met	Lys	Val	Ala	Val	Lys	Met	Leu	Lys	Pro		
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Thr	Ala	Arg	Ser	Ser	Glu	Lys	Gln	Ala	Leu	Met	Ser	Glu	Leu	Lys	Ile		
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Gly	Asp	Leu	Val	Asn	Tyr	Leu	His	Lys	Asn	Arg	Asp	Ser	Phe	Leu	Ser		
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Pro	Ala	Asp	Glu	Ser	Thr	Arg	Ser	Tyr	Val	Ile	Leu	Ser	Phe	Glu	Asn		
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Asn	Gly	Asp	Tyr	Met	Asp	Met	Lys	Gln	Ala	Asp	Thr	Thr	Gln	Tyr	Val		
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ccc	atg	cta	gaa	agg	aaa	gag	gtt	tct	aaa	tat	tcc	gac	atc	cag	aga		2671
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Ser Leu Tyr Asp Arg Pro Ala Ser Tyr Lys Lys Lys Ser Met Leu Asp			
760	765	770	775
tca gaa gtc aaa aac ctc ctt tca gat gat aac tca gaa ggc ctt act			2767
Ser Glu Val Lys Asn Leu Leu Ser Asp Asp Asn Ser Glu Gly Leu Thr			
	780	785	790
tta ttg gat ttg ttg agc ttc acc tat caa gtt gcc cga gga atg gag			2815
Leu Leu Asp Leu Leu Ser Phe Thr Tyr Gln Val Ala Arg Gly Met Glu			
	795	800	805
ttt ttg gct tca aaa aat tgt gtc cac cgt gat ctg gct gct cgc aac			2863
Phe Leu Ala Ser Lys Asn Cys Val His Arg Asp Leu Ala Ala Arg Asn			
	810	815	820
gtc ctc ctg gca caa gga aaa att gtg aag atc tgt gac ttt ggc ctg			2911
Val Leu Leu Ala Gln Gly Lys Ile Val Lys Ile Cys Asp Phe Gly Leu			
	825	830	835
gcc ana nnn nnn nnn nnn nnn nnc tat gtg tcg aaa ggc agt acc			2959
Ala Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Val Ser Lys Gly Ser Thr			
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ttt ctg ccc gtg aag tgg atg gct cct gag agc atc ttt gac aac ctc			3007
Phe Leu Pro Val Lys Trp Met Ala Pro Glu Ser Ile Phe Asp Asn Leu			
	860	865	870
tac acc aca ctg agt gat gtc tgg tct tat ggc att ctg ctc tgg gag			3055
Tyr Thr Thr Leu Ser Asp Val Trp Ser Tyr Gly Ile Leu Leu Trp Glu			
	875	880	885
atc ttt tcc ctt ggt ggc acc cct tac ccc ggc atg atg gtg gat tct			3103
Ile Phe Ser Leu Gly Gly Thr Pro Tyr Pro Gly Met Met Val Asp Ser			
	890	895	900
act ttc tac aat aag atc aag agt ggg tac cgg atg gcc aag cct gac			3151
Thr Phe Tyr Asn Lys Ile Lys Ser Gly Tyr Arg Met Ala Lys Pro Asp			
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cac gct acc agt gaa gtc tac gag atc atg gtg aaa tgc tgg aac agt			3199
His Ala Thr Ser Glu Val Tyr Glu Ile Met Val Lys Cys Trp Asn Ser			
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gag ccg gag aag aga ccc tcc ttt tac cac ctg agt gag att gtg gag			3247
Glu Pro Glu Lys Arg Pro Ser Phe Tyr His Leu Ser Glu Ile Val Glu			
	940	945	950
aat ctg ctg cct gga caa tat aaa aag agt tat gaa aaa att cac ctg			3295
Asn Leu Leu Pro Gly Gln Tyr Lys Lys Ser Tyr Glu Lys Ile His Leu			
	955	960	965
gac ttc ctg aag agt gac cat cct gct gtg gca cgc atg cgt gtg gac			3343
Asp Phe Leu Lys Ser Asp His Pro Ala Val Ala Arg Met Arg Val Asp			
	970	975	980
tca gac aat gca tac att ggt gtc acc tac aaa aac gag gaa gac aag			3391
Ser Asp Asn Ala Tyr Ile Gly Val Thr Tyr Lys Asn Glu Glu Asp Lys			
	985	990	995

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Asp	Ser	Gly	Tyr	Ile	Ile	Pro	Leu	Pro	Asp	Ile	Asp	Pro	Val	Pro	
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Glu	Glu	Glu	Asp	Leu	Gly	Lys	Arg	Asn	Arg	His	Ser	Ser	Gln	Thr	
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Ser	Glu	Glu	Ser	Ala	Ile	Glu	Thr	Gly	Ser	Ser	Ser	Ser	Thr	Phe	
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<223> The 'Xaa' at location 560 stands for Lys, Asn, Arg, Ser, Thr,
Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp,
Cys, or Phe.

<220>
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<223> The 'Xaa' at location 561 stands for Lys, Asn, Arg, Ser, Thr,
Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp,
Cys, or Phe.

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<223> The 'Xaa' at location 562 stands for Lys, Asn, Arg, Ser, Thr,
Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp,
Cys, or Phe.

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<223> The 'Xaa' at location 563 stands for Lys, Asn, Arg, Ser, Thr,
Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp,
Cys, or Phe.

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Cys, or Phe.

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<223> The 'Xaa' at location 566 stands for Lys, Asn, Arg, Ser, Thr,
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Cys, or Phe.

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<223> The 'Xaa' at location 567 stands for Lys, Asn, Arg, Ser, Thr,
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Cys, or Phe.

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<223> The 'Xaa' at location 568 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 569 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

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<223> The 'Xaa' at location 570 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>
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<222> (571)..(571)
<223> The 'Xaa' at location 571 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>
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<222> (841)..(841)
<223> The 'Xaa' at location 841 stands for Lys, Arg, Thr, or Ile.

<220>
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<222> (842)..(842)
<223> The 'Xaa' at location 842 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 843 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

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<223> The 'Xaa' at location 844 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

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<223> The 'Xaa' at location 846 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>

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<223> The 'Xaa' at location 847 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<220>

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<222> (848)..(848)

<223> The 'Xaa' at location 848 stands for Asn, Ser, Thr, Ile, Asp, Gly, Ala, Val, His, Arg, Pro, Leu, Tyr, Cys, or Phe.

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Gly	Leu	Ser	Leu	Ile	Leu	Cys	Gln	Leu	Ser	Leu	Pro	Ser	Ile	Leu	Pro
			20				25						30		

Asn	Glu	Asn	Glu	Lys	Val	Val	Gln	Leu	Asn	Ser	Ser	Phe	Ser	Leu	Arg
			35				40					45			

Cys	Phe	Gly	Glu	Ser	Glu	Val	Ser	Trp	Gln	Tyr	Pro	Met	Ser	Glu	Glu
	50					55					60				

Glu	Ser	Ser	Asp	Val	Glu	Ile	Arg	Asn	Glu	Glu	Asn	Asn	Ser	Gly	Leu
65					70					75					80

Phe	Val	Thr	Val	Leu	Glu	Val	Ser	Ser	Ala	Ser	Ala	Ala	His	Thr	Gly
				85					90					95	

Leu	Tyr	Thr	Cys	Tyr	Tyr	Asn	His	Thr	Gln	Thr	Glu	Glu	Asn	Glu	Leu
			100					105					110		

Glu	Gly	Arg	His	Ile	Tyr	Ile	Tyr	Val	Pro	Asp	Pro	Asp	Val	Ala	Phe
			115				120					125			

Val	Pro	Leu	Gly	Met	Thr	Asp	Tyr	Leu	Val	Ile	Val	Glu	Asp	Asp	Asp
	130					135					140				

Ser	Ala	Ile	Ile	Pro	Cys	Arg	Thr	Thr	Asp	Pro	Glu	Thr	Pro	Val	Thr
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Leu	His	Asn	Ser	Glu	Gly	Val	Val	Pro	Ala	Ser	Tyr	Asp	Ser	Arg	Gln
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Gly Phe Asn Gly Thr Phe Thr Val Gly Pro Tyr Ile Cys Glu Ala Thr
 180 185 190

Val Lys Gly Lys Lys Phe Gln Thr Ile Pro Phe Asn Val Tyr Ala Leu
 195 200 205

Lys Ala Thr Ser Glu Leu Asp Leu Glu Met Glu Ala Leu Lys Thr Val
 210 215 220

Tyr Lys Ser Gly Glu Thr Ile Val Val Thr Cys Ala Val Phe Asn Asn
 225 230 235 240

Glu Val Val Asp Leu Gln Trp Thr Tyr Pro Gly Glu Val Lys Gly Lys
 245 250 255

Gly Ile Thr Met Leu Glu Glu Ile Lys Val Pro Ser Ile Lys Leu Val
 260 265 270

Tyr Thr Leu Thr Val Pro Glu Ala Thr Val Lys Asp Ser Gly Asp Tyr
 275 280 285

Glu Cys Ala Ala Arg Gln Ala Thr Arg Glu Val Lys Glu Met Lys Lys
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Val Thr Ile Ser Val His Glu Lys Gly Phe Ile Glu Ile Lys Pro Thr
 305 310 315 320

Phe Ser Gln Leu Glu Ala Val Asn Leu His Glu Val Lys His Phe Val
 325 330 335

Val Glu Val Arg Ala Tyr Pro Pro Arg Ile Ser Trp Leu Lys Asn
 340 345 350

Asn Leu Thr Leu Ile Glu Asn Leu Thr Glu Ile Thr Thr Asp Val Glu
 355 360 365

Lys Ile Gln Glu Ile Arg Tyr Arg Ser Lys Leu Lys Leu Ile Arg Ala
 370 375 380

Lys Glu Glu Asp Ser Gly His Tyr Thr Ile Val Ala Gln Asn Glu Asp
 385 390 395 400

Ala Val Lys Ser Tyr Thr Phe Glu Leu Leu Thr Gln Val Pro Ser Ser
 405 410 415

Ile Leu Asp Leu Val Asp Asp His His Gly Ser Thr Gly Gly Gln Thr
 420 425 430

Val Arg Cys Thr Ala Glu Gly Thr Pro Leu Pro Asp Ile Glu Trp Met
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Ile Cys Lys Asp Ile Lys Lys Cys Asn Asn Glu Thr Ser Trp Thr Ile
 450 455 460

Leu Ala Asn Asn Val Ser Asn Ile Ile Thr Glu Ile His Ser Arg Asp
 465 470 475 480

Arg Ser Thr Val Glu Gly Arg Val Thr Phe Ala Lys Val Glu Glu Thr
 485 490 495

Ile Ala Val Arg Cys Leu Ala Lys Asn Leu Leu Gly Ala Glu Asn Arg
 500 505 510

Glu Leu Lys Leu Val Ala Pro Thr Leu Arg Ser Glu Leu Thr Val Ala
 515 520 525

Ala Ala Val Leu Val Leu Leu Val Ile Val Ile Ile Ser Leu Ile Val
 530 535 540

Leu Val Val Ile Trp Lys Gln Lys Pro Arg Tyr Glu Ile Arg Trp Xaa
 545 550 555 560

Xaa Xaa Xaa Xaa Ile Xaa Xaa Xaa Xaa Xaa Xaa Tyr Ile Tyr Val Asp
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Pro Met Gln Leu Pro Tyr Asp Ser Arg Trp Glu Phe Pro Arg Asp Gly
 580 585 590

Leu Val Leu Gly Arg Val Leu Gly Ser Gly Ala Phe Gly Lys Val Val
 595 600 605

Glu Gly Thr Ala Tyr Gly Leu Ser Arg Ser Gln Pro Val Met Lys Val
 610 615 620

Ala Val Lys Met Leu Lys Pro Thr Ala Arg Ser Ser Glu Lys Gln Ala
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Leu Met Ser Glu Leu Lys Ile Met Thr His Leu Gly Pro His Leu Asn
 645 650 655

Ile Val Asn Leu Leu Gly Ala Cys Thr Lys Ser Gly Pro Ile Tyr Ile
 660 665 670

Ile Thr Glu Tyr Cys Phe Tyr Gly Asp Leu Val Asn Tyr Leu His Lys
 675 680 685

Asn Arg Asp Ser Phe Leu Ser His His Pro Glu Lys Pro Lys Lys Glu
 690 695 700

Leu Asp Ile Phe Gly Leu Asn Pro Ala Asp Glu Ser Thr Arg Ser Tyr
 705 710 715 720

Val Ile Leu Ser Phe Glu Asn Asn Gly Asp Tyr Met Asp Met Lys Gln
 725 730 735

Ala Asp Thr Thr Gln Tyr Val Pro Met Leu Glu Arg Lys Glu Val Ser
 740 745 750

Lys Tyr Ser Asp Ile Gln Arg Ser Leu Tyr Asp Arg Pro Ala Ser Tyr
 755 760 765

Lys Lys Lys Ser Met Leu Asp Ser Glu Val Lys Asn Leu Leu Ser Asp
 770 775 780

Asp Asn Ser Glu Gly Leu Thr Leu Leu Asp Leu Leu Ser Phe Thr Tyr
 785 790 795 800

Gln Val Ala Arg Gly Met Glu Phe Leu Ala Ser Lys Asn Cys Val His
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Arg Asp Leu Ala Ala Arg Asn Val Leu Leu Ala Gln Gly Lys Ile Val
 820 825 830

Lys Ile Cys Asp Phe Gly Leu Ala Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Tyr Val Ser Lys Gly Ser Thr Phe Leu Pro Val Lys Trp Met Ala Pro
 850 855 860

Glu Ser Ile Phe Asp Asn Leu Tyr Thr Thr Leu Ser Asp Val Trp Ser
 865 870 875 880

Tyr Gly Ile Leu Leu Trp Glu Ile Phe Ser Leu Gly Gly Thr Pro Tyr
 885 890 895

Pro Gly Met Met Val Asp Ser Thr Phe Tyr Asn Lys Ile Lys Ser Gly

900

905

910

Tyr Arg Met Ala Lys Pro Asp His Ala Thr Ser Glu Val Tyr Glu Ile
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Met Val Lys Cys Trp Asn Ser Glu Pro Glu Lys Arg Pro Ser Phe Tyr
 930 935 940

His Leu Ser Glu Ile Val Glu Asn Leu Leu Pro Gly Gln Tyr Lys Lys
 945 950 955 960

Ser Tyr Glu Lys Ile His Leu Asp Phe Leu Lys Ser Asp His Pro Ala
 965 970 975

Val Ala Arg Met Arg Val Asp Ser Asp Asn Ala Tyr Ile Gly Val Thr
 980 985 990

Tyr Lys Asn Glu Glu Asp Lys Leu Lys Asp Trp Glu Gly Gly Leu Asp
 995 1000 1005

Glu Gln Arg Leu Ser Ala Asp Ser Gly Tyr Ile Ile Pro Leu Pro
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Asp Ile Asp Pro Val Pro Glu Glu Glu Asp Leu Gly Lys Arg Asn
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Arg His Ser Ser Gln Thr Ser Glu Glu Ser Ala Ile Glu Thr Gly
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Ser Ser Ser Ser Thr Phe Ile Lys Arg Glu Asp Glu Thr Ile Glu
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Asp Ile Asp Met Met Asp Asp Ile Gly Ile Asp Ser Ser Asp Leu
 1070 1075 1080

Val Glu Asp Ser Phe Leu
 1085